

insulating film;

a plug composed of a conducting film buried in the via hole;

an upper interconnect buried in the interconnect groove; and

a barrier layer formed between the insulating film and the plug, the insulating film and the upper interconnect, and the plug and the lower interconnect,

wherein the conducting film comprises copper, aluminum or silver,

wherein the barrier layer is composed of a laminated film including a lower first barrier layer and an upper second barrier layer, and

wherein the first barrier layer is made from a tantalum nitride film, and the second barrier layer is made from a tantalum film having a β -crystal structure.

20. (New) The semiconductor device of Claim 19, wherein the conducting film is a copper film.

21. (New) The semiconductor device of Claim 20, wherein the copper film is oriented to the (111) plane.

22. (New) The semiconductor device of Claim 19, wherein a value of (a number of nitrogen atoms)/(a number of tantalum atoms) of the tantalum nitride film is 0.4 or less.

23. (New) The semiconductor device of Claim 19, wherein the insulating film includes a fluorine component.

24. (New) The semiconductor device of Claim 19, wherein the second barrier layer is deposited on the first barrier layer.

25. (New) A semiconductor device comprising:

- an insulating film formed on a semiconductor substrate;
- a lower interconnect formed in the insulating film;
- a first interlayer insulating film formed on the lower interconnect and the insulating film;
- a via hole formed on the lower interconnect and in the first interlayer insulating film;
- a second interlayer insulating film formed on the first interlayer insulating film;
- an interconnect groove formed in an upper region of the via hole and in the second interlayer insulating film;
- a barrier layer formed respectively on a bottom and walls of the via hole and the interconnect groove; and
- a plug and an upper interconnect composed of a conducting film formed on the barrier layer provided in the via hole and the interconnect groove,

wherein the conducting film comprises copper, aluminum or silver,

wherein the barrier layer is composed of a laminated film including a lower first barrier layer and an upper second barrier layer, and

wherein the first barrier layer is made from a tantalum nitride film, and the second barrier layer is made from a tantalum film having a β -crystal structure.

26. (New) The semiconductor device of Claim 25, wherein the conducting film

is a copper film.

27. (New) The semiconductor device of Claim 26, wherein the copper film is oriented to the (111) plane.

28. (New) The semiconductor device of Claim 25, wherein a value of (a number of nitrogen atoms)/(a number of tantalum atoms) of the tantalum nitride film is 0.4 or less.

29. (New) The semiconductor device of Claim 25, wherein the first interlayer insulating film or the second interlayer insulating film includes a fluorine component.

30. (New) The semiconductor device of Claim 19, wherein the second barrier layer is deposited on the first barrier layer.

31. (New) A method for fabricating a semiconductor device comprising the steps of:

forming an insulating film on a semiconductor substrate;

forming a lower interconnect in the insulating film;

forming a first interlayer insulating film on the lower interconnect and the insulating film;

forming a via hole on the lower interconnect and in the first interlayer insulating film;

forming a second interlayer insulating film on the first interlayer insulating

film;

forming an interconnect groove in an upper region of the via hole and in the second interlayer insulating film;

forming a barrier layer respectively on a bottom and walls of the via hole and the interconnect groove; and

forming a plug and an upper interconnect composed of a conducting film formed on the barrier layer provided in the via hole and the interconnect groove,

wherein the conducting film comprises copper, aluminum or silver,

wherein the barrier layer is composed of a laminated film including a lower first barrier layer and an upper second barrier layer, and

wherein the first barrier layer is made from a tantalum nitride film, and the second barrier layer is made from a tantalum film having a β -crystal structure.

32. (New) The method of Claim 31, wherein the conducting film is a copper film.

33. (New) The method of Claim 32, wherein the copper film is oriented to the (111) plane.

34. (New) The method of Claim 31, wherein a value of (a number of nitrogen atoms)/(a number of tantalum atoms) of the tantalum nitride film is 0.4 or less.

35. (New) The method of Claim 31, wherein the first interlayer insulating film or the second interlayer insulating film includes a fluorine component.